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Notes on the Black-breasted Button-quail at Widgee, Queensland

by PETER HUGHES and BEVLY HUGHES, Hawkins Road, Widgee via Gympie, Queensland 4570

Summary

Observations are presented on habitat, population, feeding and breeding behaviour, voice and territory of the Black-breasted Button-quail *Turnix melanogaster* near Gympie in south-east Queensland. The species appears dependent on vine scrub with a moist, deep leaf-litter layer, and occurs in adjacent unburnt forest with a deep litter layer. The population has increased since cessation of frequent burning; female territory size is c. 1.5 ha. Food appears to be litter invertebrates. Females appear to have a role in the care of feathered juveniles.

Introduction

The Black-breasted Button-quail *Turnix melanogaster* is rarely observed and has been little researched. Jerrard (1925, 1926, 1927) gave details of calls, of probable numbers and female pivot-feeding, and the male call in defence of the young. Lord (1932) reported on numbers in south-east Queensland in 1927. Sharland (1959) described feeding depressions and the female pivot-feeding. Recently, observations have been presented on the breeding of captive birds and the roles of the sexes (Muller 1976, Phipps 1976, Mills 1985, Shephard 1989). Bennett (1985) reviewed the species' distribution, status and habitat, and presented new field observations.

The Black-breasted Button-quail has declined in range and numbers through habitat clearance; its status is classified as 'indeterminate', i.e. 'rare', 'vulnerable' or 'endangered', but it is not clear which (Bennett 1985, Brouwer & Garnett 1990). It has been characterised as a bird of deep leaf-litter beneath dry closed forests, although its ecology is poorly understood and its requirements need to be determined (Bennett 1985, Brouwer & Garnett 1990). Recent works have also characterised the species as polyandrous, the male being the sole parent as in other *Turnix* species, although Schodde & Tidemann (1986) stated that a female has been seen as part of a family group.

Our observations concern habitat; apparent changes in population; feeding, breeding and other behaviour; voice; and territory. All observations have been at Widgee (26°13′ S, 152°28′E) in south-east Queensland since 1966. Some of our observations are at variance with the literature, particularly on parental behaviour.

Habitat

Areas in which Black-breasted Button-quail have been observed range from relatively original vine scrub, to regrowth after clearing of the vine scrub, and open sclerophyll forest. The vine scrub is dominated by emergent Hoop Pine *Araucaria cunninghamii* with other vegetation forming a canopy at about 10-15 metres. The floor of the vine scrub has a layer of leaf-litter up to 50 mm deep. Lantana *Lantana camara* is present in gaps in the scrub and is not particularly thick. In regrowth areas vegetation consists largely of Brush Ironbark *Eucalyptus* sp., wattle *Acacia aulacocarpa* and Lantana thickets in the more open areas. The open sclerophyll forest comprises a canopy mainly of Spotted Gum *Eucalyptus maculata* with scattered small trees and shrubs to about 2-5 metres. Ground cover consists of clumps of Wallaby Grass *Danthonia* sp. and a layer of leaf-litter about 25 mm deep. All areas have in common a litter layer that stays moist for long periods.

Rainfall in 1966-72 was seasonal, with most rain falling in summer-early autumn, a drier winter-spring and storm rains late spring-early summer. Yearly totals were as follows, averaging 1034 mm:

1966 — 1150 mm	1970 — 1023 mm
1967 — 800 mm	1971 — 1297 mm
1968 — 900 mm	1972 — 1249 mm
1969 — 820 mm	

Dry periods throughout the year are associated with a heavy leaf-fall.

Population

Our first sighting of Black-breasted Button-quail (in 1966) was of a female in an area 1.2 km away from the study area. During the next six years Button-quail numbers increased until they were seen in all areas of what we thought was suitable habitat. Since 1972 Button-quail have been seen regularly in all habitat areas and in areas of Rhodes Grass *Chloris gayana* pasture adjacent to habitat areas. A factor influencing numbers may have been the cessation of 'burning off'. Before 1966 the habitat areas had been burnt on an irregular basis every 2-4 years. With burning no longer carried out, the leaf-litter became permanent and stabilised to a depth of 25-35 mm.

A habitat area close to the house was regularly hunted by a domestic cat. During the period 1966-72 when Button-quail numbers were increasing, the cat caught numbers of various quail species, Bush-hens *Gallinula olivacea* and small animals. These prey were brought into the house, but during that time we did not find the cat with any Black-breasted Button-quail. This suggests that predation by domestic or feral predators may be a minor risk for this species.

Plumage

The outstanding features of the female are the black head and face with a broad band of black extending to the breast. The shoulders have white flecks on a dark background. The black breast seems to be more definite during the December to June period. The male and juveniles are smaller than the female, without the black head and breast. The male has strong white flecking on the breast and shoulders.

Feeding behaviour

An indication of the presence of the Black-breasted Button-quail is the 'soup-plate' feeding depressions. These patches are about 35 mm deep by 200 mm wide. They are scratched into the litter and top layer of the soil. The patches made by the Black-breasted Button-quail differ from those made by Painted Button-quail *Turnix varia* by going into the soil a short distance. Painted Button-quail scrapes move the litter but not the soil, and are not as definite in construction. Painted Button-quail have not been seen in the same habitat as the Black-breasted, only in more open forest.

Our observations indicate that the female has three methods of feeding:
(1) Construction of the 'soup-plate' feeding depressions. The female scratches the litter from under her body while turning around. Sometimes a full circle is turned, at other times two half-circles with the bird changing position to the other side of the circle.
(2) The female pecks at the litter as she walks along.
(3) The female makes a few scratching movements with her feet, at the same time stretching her wings to cover the ground, then pecks at the litter when the wings are refolded. This is possibly analogous to the shading or wing-spreading used as a foraging

strategy by some other bird species, and may serve to delay the retreat of exposed prey. This manoeuvre was carried out by the female in one territory but has not been observed in females in other territories. Pizzey (1980) stated that the 'soup-plates' are made by the 'wings and feet', but the scratching is done with the feet.

Males have not been observed to make the depressions, but to feed as the female in (2), i.e. walking and pecking.

Feeding patches vary in numbers. In some instances they are separated by 300 mm with about ten spread over a 5x10 m area. In other instances they are close together in clusters with only 50 mm separating the 'soup-plates'. There is then a gap of up to 10 m or more before the next cluster. The areas on the edge of habitat appear to be used more frequently than those deeper in.

Examination of litter that has had feeding patches constructed in it, up to a week after the patches were made, gives the subjective impression of a lesser number of small invertebrates than in the undisturbed litter. Counts or identification of litter invertebrates have not been attempted. It seems that invertebrates are the main food. Birds feeding by all methods have been observed to extend the neck to peck at something and also to move a few short steps as if chasing something.

Breeding behaviour

There does not appear to be a clearly defined breeding season. In 1968 females were seen with feathered young from August to December, whereas in 1972 females with feathered young were seen from January to June. Females on these occasions had between four and seven juveniles with them, groups of >4 young representing at least two broods as the clutch size is 3-4 eggs (e.g. Schodde & Tidemann 1986). We have not seen males with young, although it is well established that males, rather than females, care for hatchlings. The identification of the birds with the females as juveniles was based on their relative sizes. The juveniles were one-third to one-half the size of the (obvious) female. Adult male size is about two-thirds to three-quarters that of the female. The females maintained a positive association with the juveniles, by foraging with them and keeping contact with calls. The females appeared to assist the juveniles' feeding: the juveniles moved in to feed as soon as the females had finished scratching feeding-scrapes, and females appeared to construct the scrapes more frequently when with juveniles than when alone. When with juveniles, the females uttered a soft whistle and when they moved to new feeding areas, they called the young to them with higher-pitched whistles.

An apparent nest has been observed. In December 1974 a female was seen over a period of 30 minutes to make 20 return journeys to a large, flat domed structure with an external diameter of about 250 mm and about 150 mm high. The structure was made of grass and was built in a tangle of Lantana stems, about 300 mm above the ground on a mound of earth at the base of a steep (2 m high), narrow gully. The nest is usually described as simply a lined scrape on the ground, although captive birds built nests that were globular with a side entrance (Phipps 1976) or 'roofed' (Mills 1985).

The female walked about 5-10 m away from the nest to peck at something in the litter and then returned to the nest. She hopped up on the stems to the entrance and put her head inside for a few seconds. On five occasions she returned to the nest without pecking at anything in the litter, but on each of these she still put her head inside the nest before again moving away. She made no noise during the period of observation

and no noise was heard from the nest. It was not possible to investigate the contents, if any, of the nest and the observer was not able to return to the site for some days. The bird was not seen on the return visit. The female may have been building the nest, or inspecting it before or during the laying period.

General behaviour

Observation of the Black-breasted Button-quail is difficult and in most cases the best method is to locate the feeding depressions and wait in the general area. When seen, the birds move slowly away; following them is difficult in that habitat. While the observer is waiting, the bird's scratching or the female's call may be heard in the vicinity. Birds are reluctant to fly, preferring to move through the tangle of vegetation. On two occasions a female has been seen to fly. On the first occasion, a female with four juveniles was feeding in an open area under the scrub when she was disturbed. She flew about 10 m, rising to a height of about 1 m. On landing she uttered a sharp, single-note whistle which the juveniles ignored. She then walked back to within 1 m of the juveniles and called again, whereupon the juveniles went to her and they all walked to the area in which she had landed and commenced to feed. The flight was quail-like, with sudden take-off and a glide to landing. She appeared to have no difficulty in flying, and the flight was strong. The species is often described as a heavy, clumsy flier (e.g. Schodde & Tidemann 1986).

The female is the most frequently observed, and is usually alone. A female with one male has been seen on a number of occasions. A female with two males, one farther away, has been seen once. Males have rarely been seen by themselves.

Voice

We have heard the female Black-breasted Button-quail make two calls. The first is the contact whistle mentioned earlier, which is also used to alert the young to danger. The second appears to be a territory call. The female makes this call as she patrols her territory by moving rapidly through the vegetation. As the call is being made, the throat can be seen pulsating, the head is not held erect and the bird has been seen to call while moving. This call is a low frequency (400 Hz) drumming made in groups of five to seven separate, rapid notes then a pause of 1.4 to 1.5 seconds, with 14-21 (5-7 note) calls in each sequence. Each pulse of notes lasts 1.5-2 seconds. After two or three calls in the sequence, volume increases slightly and decreases towards the end of the sequence. The call does not carry for much more than 20 metres. There is a ventriloquial quality to the call, as it is hard to pinpoint the female exactly from the call direction. The female does not call all year round but after about 100 mm of rain over a few days, no matter what month, the territory call will commence.

The male call, when in company with a patrolling female, is a sharp 'cluck' made up to three times in succession. He does not respond to every sequence of calls made by the female, nor does she immediately respond to his clucks. When the male is with a patrolling female he tries to keep as close to her as possible, and has to run to keep pace with her rapid progress. If he lags behind or has to detour round an obstruction, the female does not wait.

The printed descriptions of the female territory call as a 'boom' we feel would be more accurately described as a low, tremulous drumming (as could be made by rapidly vibrating the lips). Phipps (1976) described the call as 'drumming', and H.J. Frith (in Slater 1970) described it as rapid 'thumping'. Frith (in Slater 1970) also reported

a 'loud crow' which we have not heard and which is not mentioned in other recent literature; this statement was apparently made in error as it is unlikely that this species makes such a call. The call of the Black-breasted Button-quail on some commercial tape recordings appears to be that of the male, and we feel that this should be indicated as the 'cluck' is rarely heard. Phipps (1976) has described other male calls.

Territory

The female appears to hold a territory against other females. The territory studied was about 300 m x 50 m (c. 1.5 ha). Most of this territory is regrowth vine scrub and Lantana with a small area of Wallaby Grass and Rhodes Grass. The territory is crossed by one road 3 m wide and a narrower overgrown track. On one side is a pasture area, and the other side of the L-shaped territory is the house and continuous vine scrub.

As the female patrols she calls at intervals until she reaches the boundary, when she stops and gives up to 15 call sequences. She then returns via a slightly different route, calling as she goes, to the other end of the territory. The female in the studied area has approached the boundary on a number of sightings but has always stopped at the same line. There is a female in the vine scrub adjoining the study territory, but she has not been observed to approach the boundary. She has been heard to call but not when the first female is calling.

Discussion

Our observations on the Black-breasted Button-quail's habitat, including its dependence on a deep leaf-litter layer, are in agreement with the literature (Bennett 1985, Brouwer & Garnett 1990). Our experience at Widgee suggests that the widespread practice of frequent burning in agricultural and forestry areas in south-east Queensland may be detrimental to the species, and that its population can recover in the absence of fire. It appears that, for the present, Lantana has an important role in the bird's survival by providing dense, prickly cover. However, any long-term hope may rest on the preservation of all vine-scrub remnants and the development of a litter layer in adjoining habitats (through fire exclusion).

The Button-quail's breeding season is variable, and appears dependent on rainfall. As noted above, a rainfall event of >100 mm stimulates display calling by females. Perhaps a sufficiently moist leaf-litter layer is needed, to provide the abundant litter invertebrates apparently required by breeding adults and young.

The female's role in parental care is hitherto unreported, and apparently unique in *Turnix*. Previous accounts have emphasised the male's sole-parent role, in incubation and care of hatchlings. However, in captive Painted Button-quail the female sometimes shares incubation (S. Debus pers. comm.) and females may assist in caring for chicks by feeding the male (Shephard 1989). Schodde & Tidemann (1986) noted that a female Black-breasted Button-quail has been seen in a family group. It appears that female Black-breasted Button-quail have some role in the 'shepherding' of older, almost independent young, sometimes of more than one brood (from different males?), perhaps while males are tending later clutches or broods. This may be related to the species' way of life: it is apparently sedentary in a relatively stable and rich environment, which may allow prolonged contact between a female and her mate(s) and offspring, and thus long-lasting pair bonds and a 'division of labour' between the sexes. Clearly, the social organisation of the Black-breasted Button-quail warrants further investigation.

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